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### ABSTRACT

A method to extract fault surfaces from seismic data (1,3) is disclosed. The method comprises: (a) generating at least two fault sticks (5) from the same fault from at least two slices of the seismic data wherein each slice comprises at least one fault stick from the same fault, (b) constructing an initial three-dimensional fault surface (7) containing the fault sticks, and (c) reconstructing the initial fault surface (9) using a deformable surface model to fit discontinuity or coherency information in the seismic data in an iterative process. Techniques are disclosed for constructing the initial fault surface from interpreter-provided fault nodes, and for performing the deformable surface iteration by defining an energy function for the fault surface and then minimizing the surface energy.